Enabling conditions for universities and PRIs to engage in technology transfer and commercialisation

The dynamic, multi-stage and multi-actor nature of technology transfer and commercialisation requires a sound institutional and economic environment to provide the conditions that enable universities and PRIs to engage in the process. Such prerequisites refer to: (i) the availability of infrastructure and skills, (ii) the conditions, orientation, norms and incentives relevant to research, (iii) the availability of funds and (iv) the existence of a clear IPR system.

What infrastructure is required for technology transfer and commercialization?

In addition to the human and financial resources devoted to research, the process of technology transfer and commercialisation is dependent on the existence of physical and supporting infrastructure. Physical infrastructure refers to the facilities, tools and scientific instrumentation used by the scientific and technological communities to carry out research as well as the localities offered to host spin-off companies and all other organizations' involved in the process. Supporting infrastructure embodies knowledge services, networks and schemes that sustain the links and communication among participants in the process. The individual components in this infrastructure or ecosystem require efficient connectivity and low transaction costs to produce the results needed. The provision of infrastructure may be directly linked to policy action (e.g. establishment of publically funded Science and Technology Parks) or can form part of the core activities of the participants themselves (e.g. networking of researchers, entrepreneurs, investors, knowledge brokers and so forth).

How are business and entrepreneurship skills and experience relevant for technology transfer and commercialization?

Technology transfer skills are embodied in individuals (researchers, technicians, entrepreneurs and students) and can be obtained and shared through the combination of training and learning by doing. In many cases the inventor is not necessarily an entrepreneur and entrepreneurial management needs to be brought in. Business and entrepreneurship skills are an indispensable ingredient for transforming scientific knowledge to marketable products or services and require the combination of capabilities that (indicatively) include: verbal and written communication, relationship building, creating networks, evaluating market opportunities and so forth. The development of such skills required the adequate provision of educational programs and schemes that encourage communication, on the job experience and professional interaction.

How do research careers, pay and conditions affect technology transfer and commercialization?

Considering the results of scientific research as the primary asset for technology transfer and commercialisation, its continuous production becomes a core concern for governmental planning. Ensuring a fertile flow of research output requires care for the labor conditions of researchers; in this sense, career opportunities and safety become vital and need to be accompanied by the corresponding monetary and non-monetary rewards (non-monetary rewards may include first rate laboratory facilities and the intellectual challenges of commercialisation). Such planning is closely linked with the strategic orientation of universities and PRIs and the degree of ability and willingness to engage in technology transfer.

How are community norms and incentives relevant to technology transfer and commercialization?

The representation of distinct interests and motivations that ontologically separate the scientific from the industrial circles calls for the establishment of commonly accepted norms and incentives that can facilitate technology transfer. Public policy can alleviate differences by providing an adequate incentive framework and by diffusing commonly accepted norms. On the one hand, the scientific community is in need of a suitable incentive structure in order to commercialise part of its knowledge creations while maintaining its educational and research contribution. On the other hand, businesses' sometimes lack the capacities and motivation to engage and understand the results of scientific discoveries. Towards these ends, evaluating and developing hard and soft institutions becomes essential.

How does research specialization contribute to technology transfer and commercialization?

In the context of technology transfer and technology commercialisation the division of research into categories such as basic or fundamental research and applied or directed research may have little practical significance. Research specialization of universities and PRIs reflects the relatively dominant fields of publications and/or the priority research areas in terms of human and financial resources. Such fields or priority research areas could reasonably be expected to be the domains in which the universities and PRIs would contribute the most in terms of knowledge generated, but to different extent with regard to industrially relevant knowledge. It is frequently the case that a solution to an industrial problem may be found by researchers working in an entirely different area of research from those of the problem. According to their patterns and the objectives of policy makers, research and innovation policies may promote or hamper further investments in given fields or areas and specific patterns of interactions between universities/PRIs and the firms.

How can finance enable technology transfer and commercialization?

In addition to the obvious contribution of public financing for the production of new knowledge in PRIs and universities, financing requirements are present throughout the whole process of technology transfer and commercialisation. The plethora of actors involved and the interactions between them sketch the magnitude and variety of credit needs, which governmental policies need to account for either directly or indirectly. Direct support is expressed via the implementation of funding schemes targeting the different activities of the process (grants, funds, scholarships etc) but stumbles against the scarcity of public funds. Indirect support to the process may come by providing incentives for private participation (beyond the financial returns of commercialisation) such as tax incentives, stimulation of sponsorships, improving the quality of life and other social impacts etc. Importantly, the provision of financing alone cannot guarantee the results of technology transfer as the latter remain dependent on the capacity of organizations and the transparency of financing procedures.

How do intellectual property rights enable technology transfer and commercialization?

Intellectual property rights constitute the pillar of ownership transfer and the manner in which they are regulated determines the process of transforming scientific knowledge into marketable products.

Hence, the legal status of universities, PROs as governmental organizations, and researchers and scientists as public employees determines their ability to engage in the process. The general issue is that subordination to public sector rules is not always compatible with the management of IPR. Technology transfer targets require that universities and PROs are legally authorized to own IP created from publicly funded research (subject to certain government rights); to own spinoff companies; select independently their co-investors; procure goods and services according to good commercial practices rather than more stringent public procurement rules; and, hire and fire competitively and according to business needs. This is a sensitive issue as that those investments are likely funded by taxpayers hence sound and transparent regulation is essential.

Since intellectual property is the basis of any innovation process its contribution to innovation performance is immense. Any innovation starts with a public or proprietary knowledge that may be protected in different ways dependent on the intellectual property rights (IPRs) regime where innovators operate.

Related Link: Research capabilities and resources of universities and PRIs
Processes and contributions of universities and PRIs
Universities and Public Research Institutes